

**ABSTRACT**

A SiGe spacer layer 151, a graded SiGe base layer 152 including boron, and an Si-cap layer 153 are sequentially grown through epitaxial growth over a collector layer 102 on 5 an Si substrate. A second deposited oxide film 112 having a base opening portion 118 and a P+ polysilicon layer 115 that will be made into an emitter connecting electrode filling the base opening portion are formed on the Si-cap layer 153, and an emitter diffusion layer 153a is formed by diffusing 10 phosphorus into the Si-cap layer 153. When the Si-cap layer 153 is grown, by allowing the Si-cap layer 153 to include boron only at the upper part thereof by *in-situ* doping, the width of a depletion layer 154 is narrowed and a recombination current is reduced, thereby making it possible 15 to improve the linearity of the current characteristics.